IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor: Mo-Han Fong et al. **Examiner**: Jason E. Mattis

Serial No: 09/833,864 **Art Group**: 2616

Filing Date: April 12, 2001 **Docket No**: 12452ROUS02U

Title: DISTRIBUTED BUFFER MANAGEMENT IN A HIGH DATA RATE WIRELESS NETWORK

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APPEAL BRIEF PURSUANT TO 37 C.F.R. § 41.37

Subsequent to the Final Office Action, a Notice of Appeal with a Pre-Appeal Brief was filed on September 21, 2006, and received September 25, 2006. A Notice of Panel Decision from Pre-Appeal Brief Review was mailed November 13, 2006, with an indication to proceed to the Board of Patent Appeals and Interferences. MPEP § 1206 at page 1200-7. A petition for Extension of Time accompanies this Appeal Brief to extend the period for filing to now January 16, 2007, as the period set for taking action ended on a Saturday, Sunday, or Federal Holiday. MPEP § 710.05. If any petition fee for an extension of time or any other additional fee is required, the undersigned attorney directs the office to debit such fee from deposit account number 50-2126.

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A. Real Party in Interest

All rights to the above referenced patent application have been assigned to:

Nortel Networks Limited
2351 Boulevard Alfred-Nobel
St. Laurent, Quebec, Canada H4S 2A9

B. Related Appeals and Interferences

There are no known other appeals or interferences that would directly or indirectly affect the Board's decision in the present appeal.

C. Status of the Claims

Claims 1-20 are pending. Claims 1-20 stand rejected under 35 U.S.C. 103(a) generally under the proffered combination of Haumont in view of Kim, and further in view of Farley (*see* Final Office Action mailed July 25, 2006 [*hereinafter* Final Office Action]), namely that:

Claims 1-5 and 13-17 stand rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Published Application No. 2001/0012279 to Haumont et al. ("Haumont") in view of U.S. Patent No. 6,052,713 to Kim ("Kim") and U.S. Patent No. 6,553,032 to Farley et al. ("Farley").

Claims 6-7 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Haumont in view Kim and Farley and further in view of U.S. Published Application No. 2002/0012334 to Strawczynski et al. ("Stawczynski").

Claims 8, 11-12, and 18-19 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Haumont in view of Kim.

Claims 9-10 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Haumont in view of Kim, and further in view of U.S. Patent No. 6,507,572 to Kumar et al. ("Kumar").

Claim 20 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Haumont in view Kim, and in further of Strawczynski.

D. Status of Amendments

Subsequent to the Final Office Action, a Notice of Appeal with a Pre-Appeal Brief was filed on September 21, 2006, and received by the US Patent & Trademark Office on September 25, 2006. A Notice of Panel Decision from Pre-Appeal Brief Review was mailed November 13, 2006, with an indication to proceed to the Board of Patent Appeals and Interferences, creating an Appeal Brief date of December 13, 2006, which is extendible with a Petition for Extension of Time accompanied with the appropriate fee. MPEP §1206 at page 1200-7. No amendments were filed subsequent to the final rejection.

E. Summary of claimed subject matter

The Independent claim 1 is directed to a "method of operating a wireless communication system to service high data rate forward link transmissions for a mobile station." Independent claims 8 and 13 are directed to "managing the contents of a plurality of data buffers in a wireless communication system to service forward link data transmissions for a mobile station." Independent claim 18 is directed to a base station controller.

In general, Appellant's claimed invention provides that "a mobile station may be serviced by any of the base stations of the active set of base stations at any time, when serving base station is altered, [that is], the mobile station receives forward link transmissions from another of the base stations of the active set of base stations, little interruption of data flow occurs. Thus, streaming operations may be supported." (*Specification* at page 7, lines 9-16).

In this respect, Appellant's independent claims include elements for managing contents of a central buffer and a plurality of distributed buffers. An example of a system for servicing high data rate forward link transmissions of the present invention is illustrated in FIG. 4 (reproduced below):

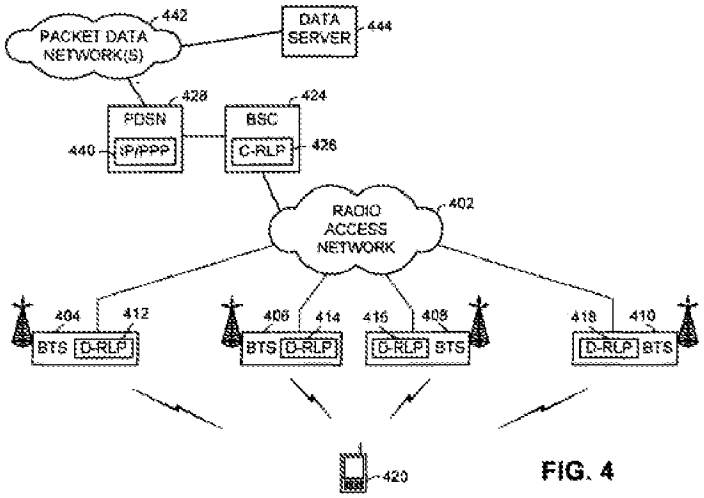


FIG. 4

With the system of FIG. 4, a central buffer (C-RLP) 426 resides in BSC 424 and each of a plurality of distributed buffers (D-RLP) 412, 414, 416, and 418 reside within active base stations 404,406, 408, and 410, respectively.

As an example, in each of the method and the base station controller claims of independent claims 1, 8, 13, and 18, accordingly, a group of blocks of data are first downloaded to the central buffer 426. Then a plurality 10 of blocks of data are downloaded from the central buffer 426 to each distributed buffer 412, 414, 416, and 418. (*see* Step 612 of Figure 6). Data blocks are then transmitted from one or more servicing base stations 404, 406, 408, and 410 to the mobile station 420.

When data refresh is required by one of the serving base stations, a next plurality of blocks of data of the group of blocks of data is downloaded *from the central buffer to each of the plurality of distributed buffers of the active set of base stations servicing the mobile station*. Determining when refresh is required may be based upon the sequence number of successfully transmitted data blocks. In any case, during refresh, each of the plurality of distributed buffers 412, 414, 416, and 418 receive copies of the same blocks of data. Using these refresh techniques, a continual stream of data blocks is available for transmission to a mobile station 420 *from any of the active set of base stations 404, 406, 408, and 410.*

With respect to a method of Appellant's claimed invention, Independent Claim 1 recites, *inter alia*, a method of operating a wireless communication system to service high data rate forward link transmissions for a mobile station, the method comprising: determining an active set of base stations for servicing the mobile station (*see* Specification at page 4, lines 12-13; Specification at 14, lines 3-7); downloading a group of blocks of data to a central buffer that services the active set of base stations (*see* Specification, page 5, lines 16-23); *for each of the*

active set of base stations, downloading a plurality of blocks of data of the group of blocks of data from the central buffer to a respective distributed buffer of the base station, wherein each block of data of the plurality of blocks of data includes a respective sequence number (*see* Specification at page 21, lines 9-11; Figure 5; Figure 6), and wherein a first block of data of the plurality of blocks of data includes an initial sequence number (*see* Specification at page 21, lines 24-25); transmitting blocks of data from a serving base station of the active set of base stations to the mobile station; receiving a sequence number from the mobile station for each block of data successfully received by the mobile station (*see* Specification at page 21, lines 26-27; *id* at page 22, lines 1-9); and when the sequence number of a block of data successfully received by the mobile station exceeds the initial sequence number by a threshold value, downloading a next plurality of blocks of data of the group of blocks of data from the central buffer to the respective distributed buffer of each base station of the active set of base stations (*see* Specification at page 19, lines 21-25; Specification at page 32, lines 9-15).

With respect to an apparatus of Appellant's claimed invention, Independent Claim 18 recites, *inter alia*, a base station controller (*see* 1102 of Figure 11) comprising: a packet data serving node interface (*see* 1120 of Figure 11); at least one base station interface that interfaces the base station controller to a plurality of base stations (*see* 1134 of Figure 11); a central buffer (*see* 1114 of Figure 11); and at least one digital processor (*see* 1104 of Figure 11) coupled to the at least one base station interface (*see* 1134 of Figure 11) that executes software instructions causing the base station controller (*see* 1102 of Figure 11) to: store a group of blocks of data in the central buffer (*see* Specification, page 5, lines 16-23); determine an active set of base stations for servicing a mobile station (*see* Specification at page 4, lines 12-13; Specification at 14, lines 3-7); download a plurality of blocks of data of the group of blocks of data stored in the central

buffer to respective distributed buffers of each base station of the active set of base stations, wherein each block of data of the plurality of blocks of data includes a respective sequence number (*see* Specification at page 21, lines 9-11; Figure 5; Figure 6), and wherein a first block of data of the plurality of blocks of data includes an initial sequence number; receive an indication from a serving base station of the active set of base stations that a data refresh is required (*see* Specification at page 25, lines 24-27 & at page 26, lines 1-2); and download a next plurality of blocks of data of the group of blocks of data stored in the central buffer to the respective distributed buffers of each base station of the active set of base stations (*see* Specification at page 7, lines 1-5; *id*. at page 26, lines 3-9).

F. Grounds of rejection to be reviewed on Appeal

Appellant requests that the rejection under 35 U.S.C. 103(a) be reviewed on Appeal, specifically:

The rejection of Claims 1-5 and 13-17 under 35 U.S.C. 103(a) as being unpatentable over U.S. Published Application No. 2001/0012279 to Haumont et al. ("Haumont") in view of U.S. Patent No. 6,052,713 to Kim ("Kim") and U.S. Patent No. 6,553,032 to Farley et al. ("Farley").

The rejection of Claims 6-7 under 35 U.S.C. 103(a) as being unpatentable over Haumont in view Kim and Farley and further in view of U.S. Published Application No. 2002/0012334 to Strawczynski et al. ("Stawczynski").

The rejection of Claims 8, 11-12, and 18-1 9 under 35 U.S.C. 103(a) as being unpatentable over Haumont in view of Kim.

The rejection of Claims 9-10 under 35 U.S.C. 103(a) as being unpatentable over Haumont in view of Kim, and further in view of U.S. Patent No. 6,507,572 to Kumar et al. ("Kumar").

The rejection of Claim 20 under 35 U.S.C. 103(a) as being unpatentable over Haumont in view Kim, and in further of Strawczynski.

G. Argument:

To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). MPEP § 2142, p. 2100-134 (Rev. 3, May 2005).

1. *Prima Facie* obviousness was not established because cited references do not teach or suggest all the claim limitations

a. Haumont *teaches away from downloading a plurality of blocks of data to each base transceiver station*

Haumont, which has been cited as the primary reference for all rejections, relates to a "method and apparatus for transmitting packets of data in a wireless communications network . . . ." (Haumont ¶ 0001). Haumont, however, teaches against providing the same data to each base station coupled to a controller, but instead, as understood, divides a block of data amongst base stations for transmission. Specifically, Haumont recites that the "problem [of lost data packets] could be overcome by transmitting all data packets to a group of neighbouring base transceiver stations. However *this proposal has the disadvantage that a high buffer overhead would be required to store the transmitted data packets. It is preferred that the buffer overhead is minimised*." (Haumont ¶ 0005 (emphasis added)). Accordingly, Haumont seeks to minimize lost packets while minimizing buffer overhead by providing the base transceiver stations 1, 2,

and/or 3 with only "necessary packets." (*see* Haumont ¶ 0010). That is, the data packet loading across the base stations is limited, instead of "determining an active set of base stations for servicing the mobile station," and "for each of the active set of base stations, downloading a plurality of blocks of data of blocks of data from the central buffer to a respective distributed buffer of the base station . . . ." (*see, e.g,* Appellant's Claims 1, 8, 13 and/or 18).

Haumont, in a further aspect, recites omitting buffers in the base transceiver stations, with a base station controller coordinating re-transmission of data packets via a particular base transceiver station. (Haumont ¶ 0079). Haumont, however, fails to disclose a system having both a central buffer in the base station controller and distributed buffers in a plurality of base stations serviced by the base station controller.

Haumont further fails to disclose, for each of an active set of base stations, downloading a plurality of blocks of data of the group of blocks of data from a central buffer to a respective distributed buffer of the base station. Haumont also fails to disclose downloading a next plurality of blocks of data of the group of blocks of data from a central buffer to the respective distributed buffer of each base station of the active set of base stations.

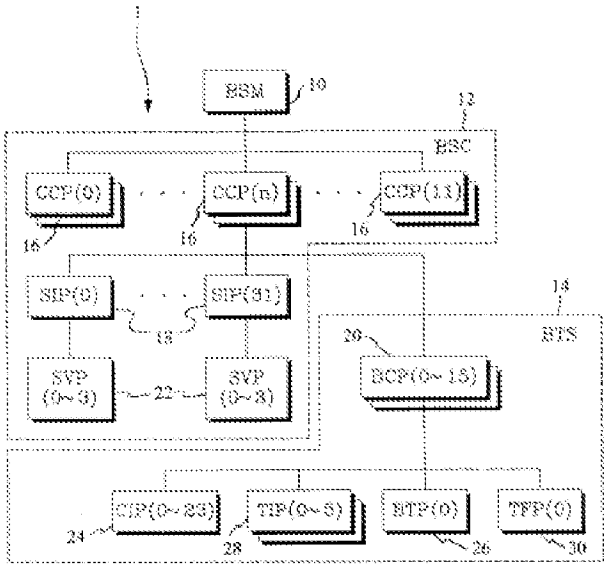
b. **Kim** ***relates to data transmission and storage of a base station subsystem, not a system and/or apparatus servicing high data rate forward link transmissions***

The Office Action cited Kim as meeting the claim elements that these references fail to meet. Appellant respectfully disagrees.

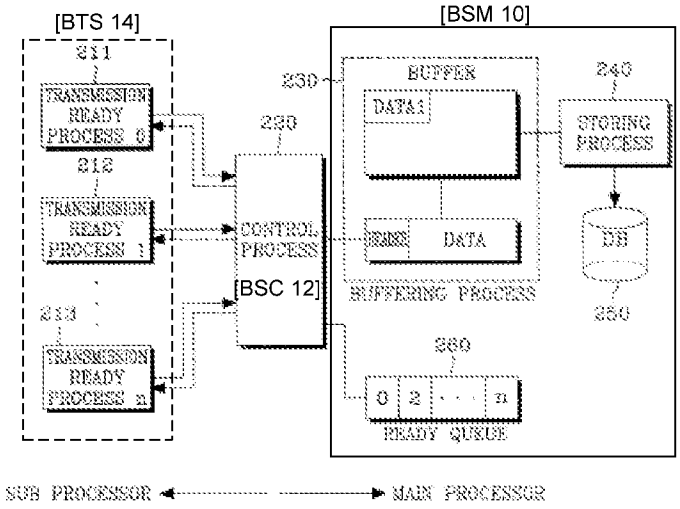
Kim relates to a "[Base Station Subsystem that] may comprise one base station manager (hereinafter, referred to as a BSM), a plurality of base station controllers (hereinafter, referred to

as BSC), and a plurality of base station transceiver subsystems (hereinafter, referred to as BTS)."

Figure 1 of Kim illustrates this arrangement:



More specifically, Kim recites a data transmitting and storing device for the BSS of its Figure 1, which is depicted in Figure 2 of Kim as:



Kim continues to explain, with respect to its Figure 2, that the "data transmitting and storing device of the present invention [that] is applied to the digital cellular system, transmission ready

processes 211 to 213 correspond to the BTS of FIG. 1, the control process 220 corresponds to the BSC of FIG. 1, the buffering process 230, the storing process 240, the data bank 250 and the ready queue 260 correspond to the BSM of FIG. 1." These cross correlations are indicated in Figure 2 above with the addition of bracketed identifiers and boxes around these elements for clarity purposes.

The background section of Kim recites that programs and data are downloaded from a main processor of a Base Station Manager (BSM) 10 to a medium processor of a Base Station Controller (BSC) 12 and from the medium processor of the BSC 12 to sub processors of respective Base station Transceiver Subsystems (BTSs) 14. (Kim Col. 1:15-63).

Kim was relied upon in the rejection of Appellant's claimed invention as providing a central buffer and distributed buffer. Appellant respectfully submits that the Office Action inappropriately infers teachings to Kim that Kim simply does not teach nor suggest. The BSM 10 of Kim instead manages, individually, each sub processor of the base transceiver station 14. As understood, Kim sets out that that different data and programming would be transmitted by the main processor of the BSM 10 or medium processor of the BSC 12 to each sub processor of the base transceiver station 14 for resource assignment. That is, the BSC 12 serves to direct data/program flow to a sub-processor.

c. **Farley** *relates to data retransmission based upon acknowledgment message traffic monitoring*

Farley relates to a "method of providing an error-free channel over a wireless communication network entails an intermediary base unit resending an individual packet over the wireless connection until the packet is received correctly." (Farley Col. 2:9-12). That is, Farley is a re-transmission device, and does not relate to data packet loading for transmission purposes.

d. Hypothetical Combination of Haumont, Kim, Farley, Stawczynski, Padovani, *and/or* Kumar *does not achieve Appellant's claimed invention*

The claims of the Appellant's claimed invention address methods and structure for servicing high data rate forward link transmissions for a mobile station. For example, independent claim 1 is directed to a "method of operating a wireless communication system to service high data rate forward link transmissions for a mobile station."

Kim fails to teach or suggest: (1) downloading a group of blocks of data to a central buffer that services the active set of base stations; (2) for each of the active set of base stations, downloading a plurality of blocks of data of the group of blocks of data from the central buffer to a respective distributed buffer of the base station; and (3) downloading a next plurality of blocks of data of the group of blocks of data from a central buffer to the respective distributed buffer of each base station of the active set of base stations as required by claim 1.

Kim fails to meet the shortcomings of Haumont, Farley, Strawczynski, Padovani, and Kumar. Therefore, Appellant respectfully submits that none of the obviousness rejections are proper and requests they be withdrawn in that a *prima facie* case of obviousness has not been established.

2. *Prima Facie* obviousness was also not established because motivation improperly stems from Appellant's Specification

The Federal Circuit has noted that "an examiner may often find every element of a claimed invention in the prior art. If identification of each claimed element in the prior art were sufficient to negate patentability, very few patents would ever issue. Furthermore, rejecting patents solely by finding prior art corollaries for the claimed elements would permit an examiner to use the claimed invention itself as a blueprint for piecing together elements in the prior art to

defeat the patentability of the claimed invention. Such an approach would be 'an illogical and inappropriate process by which to determine patentability.'" *In re Rouffet*, 149 F.3d 1350, 1357 (Fed. Cir. 1998) (quoting *Sensonics, Inc. v. Aerosonic Corp.*, 81 F.3d 1566, 1570 (Fed. Cir. 1996)). To prevent the use of hindsight based on the invention to defeat patentability of the invention, the Federal Circuit requires the examiner to show a motivation to combine the references that create the case of obviousness. In other words, the examiner must show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed. *Id.*

The Final Office Action sets out motivations improperly based upon knowledge of Appellant's claimed invention. For example, with respect to the hypothetical combination of Haumont of Kim, the cited "motivation [was] to allow a base station to directly control the retransmission of a data packet that is not acknowledged as being correctly received by a mobile station without having to again receive the packet from the base station controller." (Final Office Action at page 15). The further hypothetical combination of Farley was proffered as "motivation being to create a way to keep the base station transmission buffers full with current data while only sending an amount of data that a mobile unit can handle." (*see* Final Office Action at page 8).

Because Haumont teaches away from Appellant's claimed invention, because Kim relates simply to a base station controller that directs data packets to base transceiver stations, and because Farley relates to a retransmission device, Appellant respectfully submits that, based upon Appellant's claimed invention, loose corollaries were taken out of context from these

references and the motivation for proffering them as a bases for obviousness rejections stem from Appellant's claimed invention.

H. Conclusions

Appellant respectfully submits that none of the cited references set forth a *prima facie* case of obviousness, and that the basis for the hypothetical combination of the cited references improperly stems from Appellant's claimed invention.

For the above-provided reasons, the Appellant respectfully requests that all of the rejections of the Final Office Action be overturned and that the claims in the present application be allowed to issue.

Respectfully submitted,

Date: January 16, 2007

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I. Claims Appendix

1. (previously presented) A method of operating a wireless communication system to service high data rate forward link transmissions for a mobile station, the method comprising:

determining an active set of base stations for servicing the mobile station;

downloading a group of blocks of data to a central buffer that services the active set of base stations;

for each of the active set of base stations, downloading a plurality of blocks of data of the group of blocks of data from the central buffer to a respective distributed buffer of the base station, wherein each block of data of the plurality of blocks of data includes a respective sequence number, and wherein a first block of data of the plurality of blocks of data includes an initial sequence number;

transmitting blocks of data from a serving base station of the active set of base stations to the mobile station;

receiving a sequence number from the mobile station for each block of data successfully received by the mobile station; and

when the sequence number of a block of data successfully received by the mobile station exceeds the initial sequence number by a threshold value, downloading a next plurality of blocks of data of the group of blocks of data from the central buffer to the respective distributed buffer of each base station of the active set of base stations.

2. (original) The method of claim 1, wherein the central buffer is serviced by a base station controller, and wherein the base station controller services the plurality of base stations.

3. (original) The method of claim 2, wherein the central buffer is serviced by a services gateway switching node that services the plurality of base stations.

4. (original) The method of claim 1, wherein only one base station of the active set of base stations services forward link transmissions to the mobile station at any particular time.

5. (original) The method of 4, wherein:

the mobile station reports the sequence number of a successfully received block of data to .its serving base station; and

determining that the sequence number of a block of data successfully received by the mobile station exceeds the initial sequence number by a threshold value is determined by the mobile station's serving base station.

6. (original) The method of claim 1, wherein the wireless communication system supports the 1xEV-DO standard.

7. (original) The method of claim 1, wherein the wireless communication system supports the High Speed Downlink Packet Access standard.

8. (previously presented) A method of managing the contents of a plurality of data buffers in a wireless communication system to service forward link data transmissions for a mobile station, the method comprising:

receiving a group of blocks of data in a central buffer of a network element of the wireless communication system, wherein the network element manages a plurality of base stations of the wireless communication system;

downloading a plurality of blocks of data of the group of blocks of data from the central buffer to each of a plurality of distributed buffers resident in a respective plurality of base stations forming an active set of base stations servicing the mobile station;

transmitting blocks of data from a serving base station of the active set of base stations to the mobile station;

determining that distributed buffer refresh is required; and

downloading a next plurality of blocks of data of the group of blocks of data from the central buffer to each of the plurality of distributed buffers resident in the active set of base stations servicing the mobile station.

9. (original) The method of claim 8, wherein:

the central buffer supports centralized link layer buffering operations; and

the plurality of distributed buffers support distributed link layer buffering operations.

10. (original) The method of claim 9, wherein the central buffer and the plurality of distributed buffers support the radio link protocol.

11. (original) The method of claim 8, wherein only one base station of the active set of base stations services forward link transmissions to the mobile station at any particular time.

12. (original) The method of claim 8, wherein the network element is a base station controller.

13. (previously presented) A method of managing the contents of a plurality of data buffers in a wireless communication system to service forward link data transmissions for a mobile station, the method comprising:

receiving a group of blocks of data in a central buffer of a network element of the wireless communication system, wherein the network element services a plurality of base stations of the wireless communication system;

downloading a plurality of blocks of data of the group of blocks of data from the central buffer to each of a plurality of distributed buffers resident in a respective plurality of base stations that define an active set of base stations servicing the mobile station, wherein each block of the plurality of blocks of data includes a respective sequence number, and wherein a first block of data of the plurality of blocks of data includes an initial sequence number;

transmitting blocks of data from a serving base station of the active set of base stations to the mobile station;

for each block of data successfully received by the mobile station, receiving confirmation from the mobile station that includes a sequence number of the successfully received block of data; and

when the sequence number of a block of data successfully received by the mobile station exceeds the initial sequence number by a threshold value, downloading a next plurality of blocks of data of the group of blocks of data from the central buffer to each of the plurality of distributed buffers resident in the plurality of base stations that define the active set of base stations servicing the mobile station base.

14. (original) The method of claim 13, wherein the central buffer is serviced by a base station controller that services the plurality of base stations.

15. (original) The method of claim 13, wherein the central buffer is serviced by a services gateway switching node that services the plurality of base stations.

16. (original) The method of claim 13, wherein only one base station of the active set of base stations may be the serving base station at any particular time.

17. (original) The method of claim 13, wherein:

the mobile station reports the sequence number of a successfully received block of data to the serving base station; and

determining that the sequence number of a block of data successfully received by the mobile station exceeds the initial sequence number by a threshold value is determined by the serving base station.

18. (previously presented) A base station controller comprising:

a packet data serving node interface;

at least one base station interface that interfaces the base station controller to a plurality of base stations;

a central buffer; and

at least one digital processor coupled to the at least one base station interface that executes software instructions causing the base station controller to:

store a group of blocks of data in the central buffer;

determine an active set of base stations for servicing a mobile station;

download a plurality of blocks of data of the group of blocks of data stored in the central buffer to respective distributed buffers of each base station of the active set of base stations,

wherein each block of data of the plurality of blocks of data includes a respective sequence number, and wherein a first block of data of the plurality of blocks of data includes an initial sequence number;

receive an indication from a serving base station of the active set of base stations that a data refresh is required; and

download a next plurality of blocks of data of the group of blocks of data stored in the central buffer to the respective distributed buffers of each base station of the active set of base stations.

19. (original) The base station controller of claim 18, wherein only one base station of the active set of base stations services forward link transmissions to the mobile station at any particular time.

20. (original) The base station controller of claim 18, wherein the base station controller supports the 1xEV-DO standard

J. Evidence Appendix

No Evidence Submitted.

K. Related Proceedings Appendix

No Related Proceedings